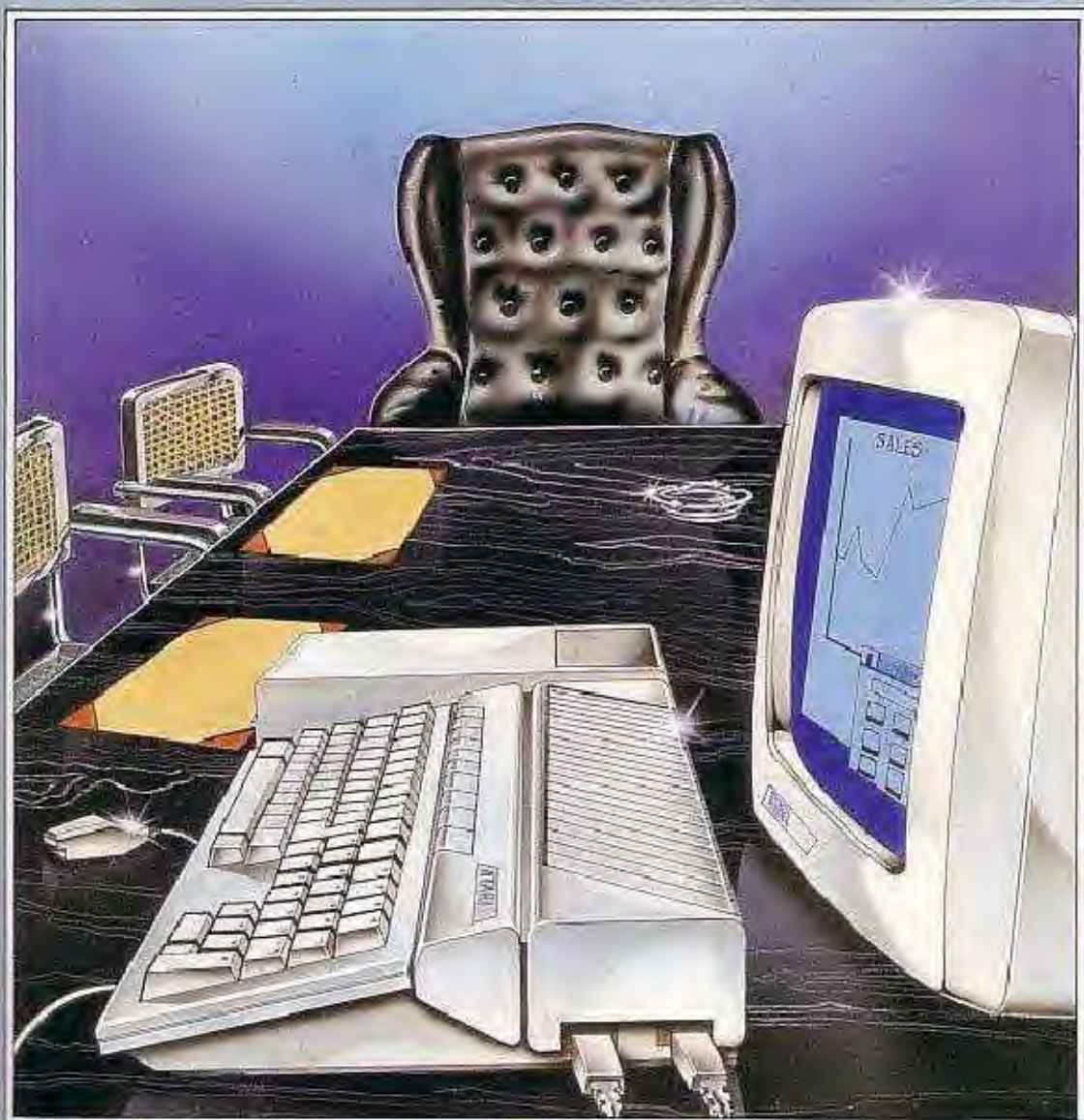


Vol. 1 No. 1

March 1986

Atari ST User



- *Under test: the first spreadsheet for the ST*
- *How Colourspace on the ST can blow your mind*
- *Atari make musical history with Midi breakthrough*

1st Choice

It's not often that a major US computer manufacturer chooses a British software house to supply bundled word processing software, but Atari have made 1st Word™ their first choice for the Atari ST™ worldwide.

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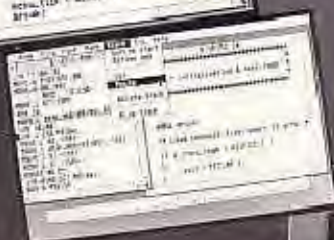
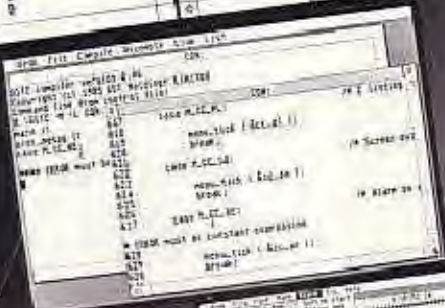
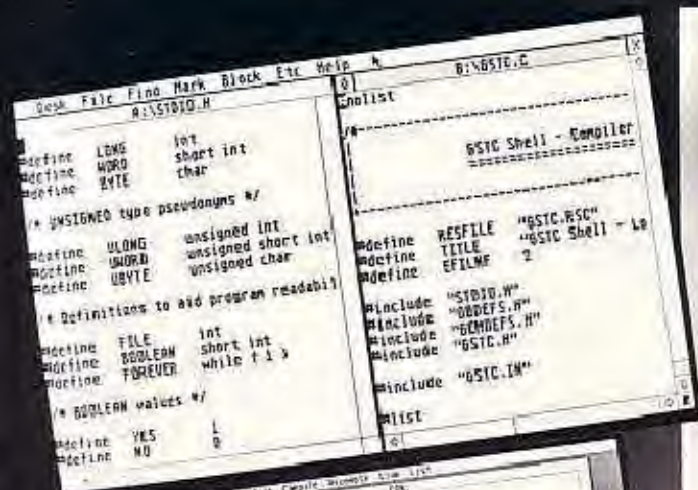
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ATARI ST™ SOFTWARE TOOLKITS FROM GST

As one of Europe's leading 68000 systems houses and an authorised Motorola consultancy, we know a thing or two about developing 68000 software. Now our own GEM™ software development tools are available to end users on the Atari ST™.

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All the components of GST Software Toolkits are fully GEM™ compatible and operate in windows with standard GEM™ functionality. Software written in GSTC™ will automatically use GEM™ windows for standard input and output without the need for special function calls.

GSTC Compiler

GSTC™ is a low cost, high functionality GEM™ software development package designed for end-users and independent software developers who wish to use their ST™ for program development in C and assembler. The package includes:

- C compiler
- 68000 assembler
- Linker
- GEM™ screen editor
- Menu-driven "shell"
- Extensive UNIX™, TOS™ and GEM™ run-time libraries
- Comprehensive user manual

GSTC™ is an ideal C primer for the beginner, yet it is powerful enough for the professional and provides compiler and assembler turn round times fast enough for the most impatient hacker! We ourselves use GSTC™ exclusively for all product development on the Atari ST™.

GST High-Level Macro Assembler

GST-ASM™ is a full Motorola compatible 68000 macro assembler with advanced features (including high-level control flow instructions and very powerful macro facilities) and extremely fast throughput. The package includes:

- 68000 macro assembler
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- GEM Screen editor
- Menu-driven "shell"
- High-level instruction macro library (IF, WHILE, REPEAT, CASE, etc.)
- Comprehensive user manual

This is probably the finest 68000 assembler on the market for any machine and represents an unbeatable combination of price, performance and facilities. It will appeal to all end-users: from the beginner who wants an easy-to-use system, the hacker who wants the fastest assembler in the galaxy, to the professional who needs a sophisticated macro assembler to develop real-time software products.

GEM™ Screen Editor

GST-EDIT™ is supplied free with GSTC™ and GST-ASM™ and can also be purchased separately for use as a general purpose text editor. All the benefits of the GEM™ operating system are used in the program which features:

- Up to four simultaneous edits in separate windows
- Block cut and paste between windows
- Comprehensive search and replace functions
- File read/write operations
- Cursor movement by mouse or keyboard operation
- Full on-screen help information

The editor can be used to generate source files for all ASCII-based programming languages for the ST™.

GST Linker

GST-LINK™ is supplied with GSTC™ and GST-ASM™ and enables separately compiled or assembled program modules to be linked together and to extract any run-time library routines from the GEM™ libraries. Facilities include:

- Simple, compact, relocatable binary format
- Optional SID™ debugger symbol
- Automatic run-time relocation of modules by the TOS™ loader
- Comprehensive link map listing with optional symbol table
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This product is available to other software developers for use with other compilers.

Because GEM™ is a friendly user-oriented system, GST software is very easy to learn and use — most facilities being available by using the mouse and pull-down menus, icons and forms. GSTC™ and GST-ASM™ have their own desktop menu-driven "shell" program that allows compile-assemble-link and assemble-link operations to be batched, avoiding tedious and error-prone command line entry.

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a Speed option and a Help facility (who said anything about cheating???)
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M-COPY *by Timothy Purves from Microtron*
Designed for duplicating program discs, M-Copy minimizes the time to make copies and ensures that the operator will notice when a copy fails.

After the source disk is copied into memory just once, all the operator has to do is put in blank discs.

M-COPY speeds through disk duplication because it formats and copies only those tracks needed by the program. Instead of wasting time on the rest of the disk, M-Copy moves on to the next disk. For the Atari ST a must for companies copying disks in bulk.

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UTILITIES *by Timothy Purves from Microtron*

Keep control over your Atari ST files, even when things go wrong. With an ability to address individual bytes, you can change file contents, change file and volume names, change file attributes, format individual disk tracks, copy individual sectors, restore deleted files, recover data from damaged disks and repair damaged disks.

Utilities works with the GLEM interface to provide easy, menu-driven operations. Changing file contents, attributes or names is just a matter of typing in the new information or clicking on selector buttons.

Even restoring deleted files only requires that you inspect data, then click on a button to save or reject it. Sector-by-sector copy and track-by-track format routines let you gently handle damaged disks.

For the Atari ST **£39.95**

DISK HELP *by Steve Bak from Microdeal*

If your disk has crashed and you're not an experienced programmer able to repair it with UTILITIES then this easy to use menu-driven program will attempt to repair the disk and bring back lost data. This program will format a disk without erasing. It will re-write the directory, check a disk and list bad sectors, repairs files with bad sectors so they become readable even on physically damaged discs. If you use data files on your ST you cannot afford to be without DISK HELP. Can be used with 1 or 2 single or double sided drives

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WELCOME to the first issue of *Atari ST User*, a magazine dedicated to the most talked-about computer of the year.

When Atari boss Jack Tramiel launched the ST in Hanover just 11 months ago, his rivals trembled. At one stroke he had transformed the image of Atari from that of an ailing games oriented company to one that had to be taken very seriously indeed.

So much so that his 16

bit machines are currently poised to dominate the business market and at the same time provide do-it-yourself programmers with the most challenging and versatile computer they have ever had their hands on.

Today some 1,500 companies around the world are producing products for the ST – that's the sort of excitement it has generated.

It is to better reflect the

growing importance of the entire ST range that *Atari ST User* has been launched.

In the months to come this magazine will play a leading – and vital – role in chronicling the tremendous and far-reaching developments now being planned. If it concerns the ST you can be sure you'll be able to read all about it in *Atari ST User*.

So jump aboard. It's going to be an exciting, stimulating ride.

The megabyte ST is coming!

MIKE COWLEY reporting

ATARI has announced the Big One in the United States – their first personal computer with one megabyte of memory. To be known as the 1040ST, the machine will cost \$999.95 with a high resolution monochrome monitor or \$1,199.95 with colour.

Although it will soon be shipped to the UK – just how soon nobody will say – the British price tags are still to be worked out. "Don't just do a direct conversion to work out how much it may cost here", warned an Atari spokesman.

The 1040ST is a business system featuring professional integrated design, with CPU, keyboard and disc drive all built in. It is to be offered complete with ST Basic, 1st Word (the word processing program currently bundled with the 520ST), NEOchrome Paint and VT52, a terminal emulator for telecommunications.

Because all current titles developed for the 520ST run on the one megabyte there will be no shortage of software to coincide with its arrival. States-side, at least, the 1040ST is to be offered exclusively for distribution by computer dealers.

In a related announcement, Atari in the US has revealed it is to provide a 20 megabyte, 5 $\frac{1}{4}$ inch hard disc peripheral. The SHD-204 claims to be the add-on to deliver the increased power requirements for most professional applications.

The 1040 is being viewed by the boys from Atari as the machine to "break the mould" which for so long has linked the company to the games market. "Now they'll realise that we are serious about the business market", says Atari vice

president Al Montross.

Features of the new machine include its built-in double sided, double density 3 $\frac{1}{2}$ inch disc drive and power supply. The operating system – the somewhat unfortunately named TOS – is in ROM, leaving the full RAM available for user applications. It offers an elegant, professional 95 key keyboard with a separate cursor, 10 function keys and an 18 key numeric keypad.

The 1040ST also boasts a built in hard disc (DMA) port, a floppy disc interface for external 3 $\frac{1}{2}$ inch drive, a built-in RS 232 serial port for use with standard modems, and an industry standard parallel port for connection to popular brand printers.

The 1040ST offers the choice of a high resolution monochrome monitor (640 by 400 pixels) or a medium resolution colour monitor (640 by 200 pixels), with a palette of 512 colours available.

When can Atari users in the UK hope to get their first glimpse of the one megabyte monster? Everyone is playing it very close to their chests for the time being. But here are some possible clues, Watson:

- What major computer event is to be held at the Novotel, London, from March 7 to 9?
- Where will Jack Tramiel be on those dates?
- Who has promised to spring a few surprises during the show?

Got it? Remember you read it first in the *Atari ST User*.

Meanwhile, the news has also been confirmed

over in the States that the 520ST is to be unbundled. And that means that the Yanks at least will be able to buy a basic 520ST with built in RF modulator for under \$400.

This one is apparently to be called the 520 STM (M for modulator). But it will also have a slightly more expensive elder brother – the 520ST FM – with a built in floppy disc drive.

Now the FM version is reported to be the replacement for the long-awaited 260ST. But at least one reliable source has actually seen a 260ST case in the Atari UK headquarters in Slough.

When the cut price 520ST M (not the FM – are you paying attention at the back?) arrives in the UK – and there's as yet no indication as to when this might happen – it is likely to be welcomed by UK manufacturers like a bad case of haemorrhoids. For at that price there will be nothing on the market to compete with it for power and performance.

However just a few recent purchasers of the bundled version might feel a little irate that they

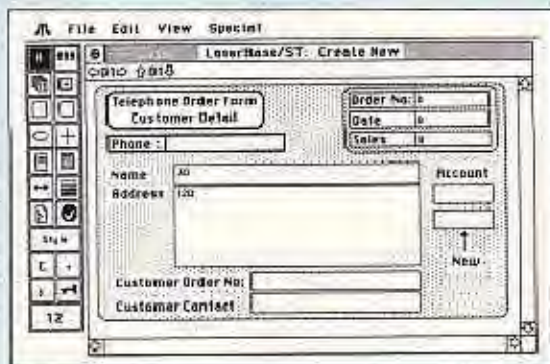
weren't even given the chance to choose. But that's the computer market for you.

Software houses worldwide are still performing like whirling dervishes to grab a slice of booming ST market. Atari president Sam Tramiel has just announced there will be a minimum of 100 new packages for the 520ST coming on market during the first quarter of 1986. In all that should make about 250 significant titles available for the machine – and subsequently the new 1040ST.

"Programming for the ST is the fastest growing segment of the computer market", insists Sam Tramiel. "Over 1,500 companies worldwide are doing serious work on the machine".

Not that this is too surprising when you recall that Jack Tramiel insisted that they bought the development systems in the first place. They don't come any sharper than Atari's chairman. You ask the people at Commodore all about that. They haven't been having it any so good since he took his leave of them.

A typical
screen layout
from Laser
Software's new
database for
the ST.



Artistic mouse

FIRST of a new range of programs promised by Ariolasoft, Degas – Design and Entertainment Graphic Art System – has been designed for the Atari ST.

It is said to provide a comprehensive range of artistic elements under the control of the computer's mouse, including 16 tools for freehand drawing or painting in a variety of widths, special functions permitting creation of geometrically perfect shapes, and an air brush that colours an area like a spray can.

A mirror function makes it possible to create symmetrical shapes or reflect an image drawn in one screen location into many other locations. Patterns drawn with the pen or brush can be filled with up to 38 pre-designed patterns, plus others which can be loaded from the program disc.

Degas runs under either disc or ROM-based Atari TOS operating system and can integrate pictures and text using existing type fonts

already on the program disc, or user-designed fonts. It costs £39.95.

Flexible database

DESIGNED to work within the Gem environment of the Atari ST, LaserBase/ST is a new database from Laser Software International. Users can design their database in any way they wish, with little limitation to field or record length. Once all the information has been entered it is still possible to rearrange the original format.

Information on the database can be presented in different ways and there are three reporting options – column, list and mailing labels. Mathematical functions included provide facilities for totals, averages, transaction or item counts, and minimum and maximum values.

Breaks can be utilised to give totals by section as well as grand totals. Searches or sorts can be made by typing in parameters in normal English, and on-line help screens are provided. Price: £99.



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K-Spread, easy on the pocket and your mind

change the size of the characters on the sheet and something called Split. This allows you to open up to five Gem windows simultaneously, each of which you may move, size and scroll independently. The option menu also controls status setting such as number of decimal places, commas, any leading sign such as £ or \$, and the manual/automatic recalculation settings.

Another of the pop-down menus provides you with file operations. These include Load and Save As, which saves a file under a new name. Give and Take. These last two allow you to save portions of all of the sheet in a form understood by the other packages in the suite. Thus you could, for example, transfer data to the word processor or graphics program.

The main Save routine seemed to contain two bugs. Firstly, pressing Return after entering filenames sometimes cancelled the save rather than executing it, even though the default mouse button was the OK function. For a beginner, and especially for someone with a high speed hard disc, this could prove disastrous if they thought that the save had been completed. The second bug came after successful completion of a save, when the system insisted on telling me "You cannot drag a cell on to the desktop", which was very interesting, but not terribly relevant.

All this is fine, but at some point you are going to want to actually enter some data on to your sheet. At this point I feel K-Spread lets itself down badly. In order to get the Data Entry window to appear you must double-click on the relevant cell. There is NO automatic keyboard entry made as seen on such programs as VisiCalc, in which as soon as you start to type the computer decides whether you are typing a number or some text, and acts accordingly.

Once you have double-clicked on the cell, you must select with the TAB key whether you want numeric, formula, or text mode. Also pressing Return after you've finished is not enough to enter the info and return you to the sheet again. For that you must click on the mouse once more. Put together, this means that you must move and select with the mouse, then type on the keyboard, then use the mouse again to finish. If you are entering a lot of assorted data, this could be extremely tedious, and it is a serious omission in a package of this nature that there is no

search operation which will find a given piece of text within your sheet, a View option which will allow reasonably large sheets.

Move/insert about the sheet is simplicity itself, with all of the normal Gem functions at your disposal. This means that you may move up, down, left or right by clicking on the arrows and scroll bars beside the sheet. You may also move the window and change its size in any way you wish. If you want to move quickly to a given cell, the options pull-down menu has a GOTO command, which defaults to the home position. Also included in the options menu is a Text Search operation which will find a given piece of text within your sheet, a View option which will

remove the desktop accessories, which should still have 100K for your sheets, or 130K if you TOS loaded from disc rather than in ROM, you which is large enough for most people. Even with on to a possible 256 by 8192 cells or boxes, temporary storage. The sheet itself is a window own icon, and there is even a clipboard for device is with a scrollwheel. The printer has its symbol and it told me "The only way to open this your sheet. I tried to double-click the disc drive means load from disc, and vice-versa to save Dragging the disc onto the spreadsheet repetitive functions.

The left hand side. You can use these to do many spreadsheet itself with a number of icons down chrome or medium res, but not to, consists of the The main display, which will run in mono-K-Spread will load.

printer. Double-click on the program file and printer type is Epson, that is, the normal system K-Spread to your own requirements. The default program, some update notes, and various directory of all the files Kuma provide - the main the SPREAD folder. You will then see the simply boot up your system and double-click on Once you have made your back-up, you want to do.

hard disc, something which many users will soon want to do.

split coffee over the only disc. The other suddenly can't use their purchase because they they will need to rely on, only to find that they No one wants to spend £50 on something right ideas as far as business software goes.

games products. I feel that Kuma has got the first thing you should do is make a back-up of program is provided on an unprotected disc, and Let's concentrate now on K-Spread. The versatile suite of programs.

A number of other packages are planned, including word processor, database, commas and new K-Spread software.

the first company to fill this gap, with its spreadsheet packages. Kuma Computers is released for the 520ST and a couple of databases, but so far there have been no spreadsheet packages. Kuma Computers is

ANDRÉ WILLEY reviews a Kuma Computer spreadsheet suite of programs



keyboard-only equivalent to the mouse operations.

The only saving grace in this area is that, once in the Data Entry window, you may complete your entry and move with a Shift-Arrow combination, which will enter the data and move in the direction of the arrow. This removes some of the hassle, but you still need to use the mouse in order to close the window completely.

I found that a great many other normal features found even in 8-bit packages such as Visicalc were missing. There were very few defined functions, for example. You are provided with MAX, MIN, MEAN (average) and SUM, but no look-up features, scientific operations or financial calculations such as interest rates. You also have no way of fixing title lines, which remain in place even if you scroll the data underneath, or repeating labels which are useful for underlining and so on.

That said, if you type a label longer than the current cell width it will overflow for as many cells as it can until it finds one which already has data in. If there is not enough space to the right, a small arrow will indicate that there is more text than can be displayed. Strangely there is no mention at all of this feature in the somewhat flimsy 17 page booklet that accompanies the program. Nor does it inform you that text fields will be highlighted, in green on a colour monitor, which came as quite a surprise.

However such things as moving and copying data are so much easier than on other systems. You simply select a cell, row, column or block with the mouse, and drag it to its new location. You may even drag it on to the clipboard for later use, which is very useful since you can't overlap your source and destination areas, which can prove rather annoying at times.

Formulae may be amended to allow for the new relative positions of cells, but unfortunately you can either change all of them or none at all — there is no option for leaving some absolute references untouched. Also the program requires you to select relative or absolute mode regardless of whether or not there are any formulae involved in the copy.

The replicate function of many spreadsheets is provided in a limited form by the ability to copy a single cell on to a row or column. Most packages of this nature would allow you to scan over the sheet to select your start and end points, but K-Spread requires you to remember the cell reference numbers in order to do this, which is no mean feat (remember 256 x 8192?). You must again remember not to copy over the original cell, which is often a little difficult, as the default settings will try to do just this.

One very nice touch here is a bar chart which indicates how long a given task will take to complete — much better than just staring at a dead screen. Similarly copying, erasing, inserting or deleting rows or columns are all extremely easy — all you need do is double click on the row/column header and up pops a menu. Click on

the other side of the column header and you can change the column width of either a single column or a group of columns.

You may also alter the way a given area of the sheet is displayed. By choosing a cell, row, column or block, and then clicking on it, you can select integer or decimal mode, left/right/centre justification, leading sign and protection (whether the system will allow you to change values within that area). The problem with this is that you may only set local values for cells with data in. If the area is currently blank you cannot change its attributes. This can be very annoying if you want to set up a column for entering money, and another for percentages, for example. The only way to do it would be to enter the figures first and then set the options.

If you are trying to create a sheet for someone else to use, such as in a business, this could be extremely annoying. When you come to print out your sheet you may either use the printer menu, or drag the sheet, or a block or the clipboard, onto the printer icon. You may also choose either to print the finished sheet or just the formulae it uses, or portions of either.

Options are included to allow page breaks, row/column header inclusion, sending of form feed and other control characters, and also which characters, if any, are used between each row and column. Drivers are included for a number of printers, or you can set up your own to allow for different sizes of paper, print styles, and translation of certain special characters into others more suited to your printer.

The overall impression one gets of K-Spread is that it has been designed to be very easy to use for the beginner, and in that it certainly succeeds, as it is quite the easiest spreadsheet I have ever had the pleasure to use. However in doing so I feel the author has had to sacrifice too much, with a whole set of useful operations missing. Also, the ease of use of a mouse can work against you if you don't provide a good keyboard alternative, as demonstrated by the awkwardness of actually entering data onto the sheet.

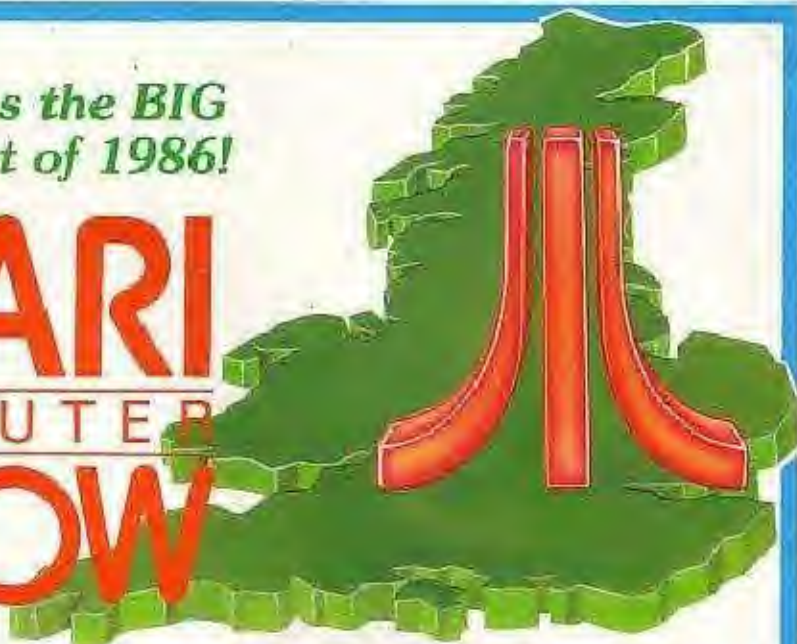
In its favour, though, are two major facts. It is available, and as of now if you want a spreadsheet, this is the only one available. Also the price is only £49.95. For such a product this is very cheap, and compares very well with the projected price of more advanced products such as VIP Professional. Although VIP will probably win hands down on features, it will also cost almost £200.

So if all you want is a relatively straightforward, easy to use, spreadsheet, which has all the bells and whistles of Gem and doesn't cost the earth, look no further than K-Spread. If, however, you feel that you will need more complex scientific calculations, macros, graphics and everything else a Lotus 1-2-3 clone can offer, perhaps you would be better off waiting for the final release of VIP Professional. That's always assuming you're not in any great hurry, of course!



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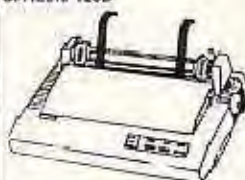
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One stuffed Yak and a 520 ST is a mixture to blow your mind

WITH his shoulder length hair, faded blue jeans, crumpled kaftan and dangling ear-ring, Jeff Minter's appearance is sufficient to give a retired colonel apoplexy. The fact that he likes to sleep "crashed out" on a stuffed Yak also does little to suggest he's not a throwback to the Flower Power days of the Sixties.

Not that the 23-year-old programmer minds. He revels in being described as the last of the hippies in his home town of Tadley, Hants. Such is his fascination with that era that he is still carrying the psychedelic torch. Only Jeff doesn't turn on with drugs but relies instead on the ST.

As the driving force behind Llamasoft, he has created Colourspace as the "ultimate mind blowing experience" on the machine. What it really is is a brilliant software toy, a kaleidoscope of controllable shapes and colours which demonstrate the graphics wonders of the ST to the full.

In its original 8 bit version it captured the imagination of no less a person than Leonard Tramiel, son of the Atari chairman and himself an executive of the corporation. Colourspace for the 520ST took Jeff Minter some five months to write "getting up at the crack of noon most days and working until the early hours of the morning".

What is the difference between the two versions? "It's like stepping out of a mini into a Ferrari", says Jeff. "The thing is that the ST is just zowie". (He even talks hippie.)

"With the 8 bit you have just 80 pixels across and 92 down. But with the ST you have 320 across and 200 down to play with. That's why I've been able to make Colourspace the first video narcotic. And that's zarjaz" (roughly translated that means nothing less than perfection).

Jeff Minter is so sold on the 520ST that he is convinced that it will not only run away with the business market but also capture the top end of the enthusiasts sector as well. "It can't be



beaten", he says.

To get the maximum effect out of Colourspace the author suggests that it is served up with a liberal helping of loud music. "With Pink Floyd it is nothing short of zowie", he says. (It seems that the hippie type vocabulary has its limitations.) "But it really should be left to people's individual tastes as long as it comes over good and strong".

An extension has been built on to the Minter home to act as Jeff's computer room. For Llamasoft is very much a family affair. Having had his fingers burned commercially a couple of times, he turned to the one person he could trust to handle his business affairs - his mother.

With mum looking after the books, Jeff retires to the computer room where he is surrounded by his collection of stuffed animals. These, apparently, help with the vibrations necessary for his work. After all, animals have always influenced his life. "I was into camels in a big way

Jeff Minter:
He found
inspiration for
Colourspace
on the back
of his yak

COLOURSPACE



...after the Mutant Camels, the Sheep in Space

at first", he recalls, "and this eventually led to a trip to Egypt". Jeff's next big love was sheep – "I didn't have to go out of the country to see these in their natural habitat" – followed by llamas and a trip to Peru.

The end result of these affairs were subsequently *Attack of the Mutant Camels*, *Sheep in Space* and *Llamasoft* itself, I suppose it could have been *Sheepsoft*, he says.

Such is his affinity for the creatures that Jeff gets considerably miffed about the way that people look on his friends, the llamas in particular. "They've had a very bad press", he says. "People say they are always spitting. Well no doubt they have only seen them in zoos, so

they are obviously brassed off and need to spit. But when I visited Peru one llama even rolled over to let me sit down in the shade. Now that can't be bad".

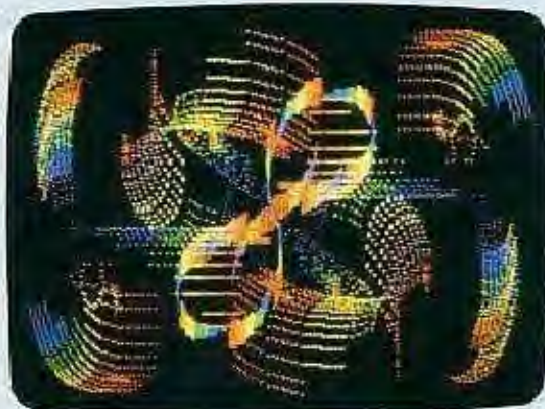
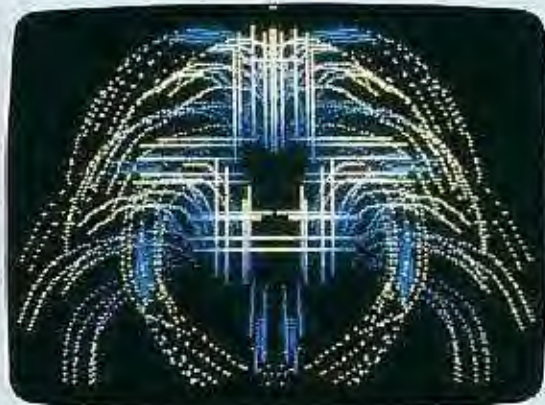
It was his latest cuddly colleague, the yak, which "helped" with *Colourspace*. He spent all of £250 on this monster when he visited a London store. Then he and a friend carried it several miles through the city to their car.

Mind you, they did bring traffic to a halt when they stopped off in Leicester Square to consume Kentucky fried chicken while both sitting astride the Yak. "Since then it's always been around when I needed it", says Jeff.

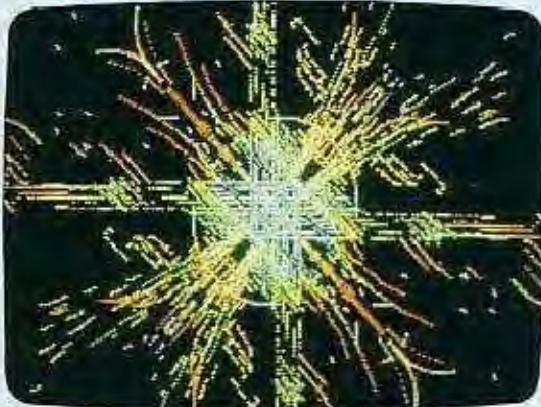
Mike Cowley

Atari ST User

bringing out all the graphic wonders of the ST



Examples of the limitless graphics effects that can be achieved using Jeff Minter's Colourspace program on the 520ST



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From Pythagoras to Midi music

WHAT is the connection between Pythagoras, Jimmy Hendrix and two sockets on the back of the Atari 520ST? They all represent great breakthroughs in electronic music. Confused? Then read on.

Pythagoras, the Greek mathematician, was strolling past a blacksmith's shop and noticed that the hammers seemed to be playing a tune as they beat on the anvils. Fascinated, he investigated, weighed the hammers and discovered that the note they emitted was proportional to their weight. A hammer twice as heavy as another produced a sound half the frequency.

Pythagoras had discovered the connection between mathematics and music. Musicians in the 1930s used his principle to produce the first electronic music. When an object vibrates, the air around expands and contracts, producing a wave form which is often audible.

An electrical current flowing through a small strip of metal, via a modulator, causes the metal to vibrate and produces a simple sine wave. A sine wave looks like a cross-section of a corrugated iron sheet and the voltage applied to the metal strip determines the frequency.

The experimental musicians of the '30s used this principle to produce a steady tone with a variable pitch. This was called a sine tone generator and was the first electronic synthesiser. The sound you hear if you forget to switch off your television late at night is made by a sine tone generator.

In the 1950s modern classical composers like Stockhausen and John Cage composed music generated electronically, rather than performed by musicians. In the 1960s rock musicians began to experiment with electronic music. Feedback and wah wah pedals featured in the music of groups like Jimmy Hendrix and The Who.

In the 1970s transistors replaced valves and made both computers and musical equipment cheaper and more compact. Groups appeared on stage with portable analogue synthesisers. A note played on the keyboard of an analogue synthesiser is generated electrically and then filtered and modified by a number of switches which split and mix sounds, determine the "shape" of a note by assigning a predetermined wave form, and designing the envelope of a sound.

The envelope has four characteristics – attack, decay, sustain and release (ADSR) – often represented graphically. A synthesised drum sound has sharp attack, swift decay, low sustain

and swift release. A synthesised violin has slow attack, higher sustain, slow decay and slow release.

Differences between sounds with similarly shaped envelopes, such as a xylophone and piano, are defined by the shape of a note's wave. Analogue synthesisers can also mix and split signals and filter sound. Their use in music was popularised by musicians like Klaus Schultz of Tangerine Dream and Brian Eno of Roxy Music.

The next breakthrough in electronic music technology was the digital synthesiser. The low cost and wide availability of silicon chips in the late 1970s, which caused the micro boom, inspired a revolutionary method of recording, generating and processing music. It was no longer necessary to generate sounds by passing variable electrical voltages through small pieces of metal. Music could be stored and created in a computer program.

Music played by an instrument connected to a digital receiver, such as a computer, would be recorded in digital form, in the memory. The process also works the other way, allowing notes to be defined digitally, amplified and played through a music system. It was no longer necessary to twiddle buttons and slide knobs to generate a sound.



Analogue synthesisers worked on a principle developed by Robert Moog

Digital synthesisers also allowed the wave shape of a particular note to be defined. The old analogue synthesisers were limited to a few pre-defined wave shapes. They worked on a principle developed by Robert Moog, called subtractive synthesis. A rich wave pattern, such as a square wave, was generated, and the unwanted elements of the sound were filtered out. Digital synthesisers work on a different principle. They build up a rich sound by combining simple wave patterns.

Records and tapes could be recorded directly from a master program, containing the music in digital form, rather than from a second or third generation audio tape. This had the effect of removing a producer or composer's reliance on a

Anthony Ginn looks at the historical background that paved the way for the marvellous music you can play using the 520ST



studio performance

The ability to define and edit a note's wave shape also enabled sounds, not available on conventional instruments or analogue synthesisers, to be produced digitally.

Another feature of the new technology was its ability to sample sound. Any sound can now be recorded through a microphone, passed through an analogue to digital converter, stored in the computer's memory and regenerated at any pitch. You can connect a microphone and keyboard to a digital recorder, burp, clap or break a glass into the microphone, and then play a tune with notes of the sampled sound, on the keyboard. This is made possible with software which first analyses the envelope, waveform and other features of the recording and then converts it to the notes represented by the keys on the keyboard.



It was always difficult to connect instruments to different computers

Digital technology enables you to burp Beethoven symphonies in the privacy of your own home, should you so desire. Live music recorded this way can be reproduced, as if played live, and controlled from a sound desk, altering time, volume and so on. Unwanted sounds can be removed and new sounds added.

It was always difficult to connect instruments to different recorders and computers. There were problems when recording several instruments simultaneously. They slowly slipped out of time with each other. The need to adopt a standardised method of communication became obvious. Instruments and equipment spoke different languages and translation was required. A standard digital interface was needed.

The largest Japanese and American manufacturers of digital equipment got together and, in 1983, announced Midi, the Musical Instrument Digital Interface. Computers and musical instruments from different manufacturers would at last talk the same language. A variety of instruments and recording equipment could be controlled from one computer.

A factor which influenced the final design of Midi was cost. Home computer owners and musicians should be able to afford it. The manufacturers looked at both serial and parallel methods of transmitting data. Serial transmission was cheaper than parallel, so it was decided to send data in series. This has led to one of the main criticisms of Midi, that the transmission system is too slow when controlling several musical instruments simultaneously.

Information inside a computer is stored in bytes. Each byte, in an 8 bit computer, contains eight bits. In parallel transmission the bits are

sent down separate wires, simultaneously. Serial transmission sends all eight bits down the same wire, one after another. Only two wires are required, one to send and one to receive. The system has a method of checking that the correct signal has been sent by receiving parity error messages through the second cable.

Midi has a special chip, the Motorola 6850 ACIA - or Asynchronous Communications Interface Adaptor chip. Its job is to package the eight bits of data before they are transmitted. It does this by adding two extra bits of data to each byte of information, making a 10 bit byte. Midi transmits at almost 3,000 serial words per second. Information is stored in a bit as either a 1 or 0. A 0 is placed at the front of the byte and a 1 at the end. This 10 bit word is then transmitted, either to the computer from the instrument, or to the instrument from the computer.

If the computer is talking to more than one instrument, each instrument will have an address. All instruments will receive all the instructions, but will only accept messages sent to their individual addresses. Otherwise a drum might try to play a guitar solo.

The address is transmitted in the eight bits of data. To transmit, receive and convert data both the computer and the musical instruments must contain an ACIA chip. These chips are expensive, and to prevent them being destroyed by a surge of power (during a heavy metal number perhaps?) they are opto-isolated. Two unconnected electrical circuits exchange signals using photoelectric cells and act like a valve to protect the chip.

Using a powerful home computer as a digital recorder, with its ability to talk to low cost musical instruments, brings the means to create high quality synthesised music within reach of the public. Atari was the first manufacturer to recognise this potential, and equipped its new ST range of computers with Midi.

A computer has the potential of shaping and editing music



If you look at the back of the 520 you'll see two plugs, marked Midi In and Midi Out. Without Pythagoras they wouldn't be there. The 520ST is a first home computer to have Midi as standard. It is possible to plug any Midi interfaced instrument directly into the micro. Signals to an instrument or tape recorder are sent through Midi Out, and signals from an instrument are received through Midi In.

The exciting thing about involving a computer in the operation is that its processing power has the potential of shaping and editing music in the



It is possible to compose music directly on the screen without mastering the skills of playing an instrument

same way that a word processor manipulates words. Once the music is in digital form inside the computer's memory it is at the mercy of the software. As far as the computer is concerned it's just another load of 1s and 0s strolling leisurely through the memory. A software designer writing for a Midi system can use graphics to display music on the screen.

Music notation has been more or less standardised in the West for the last 400 years. Music is written down on five line staves and divided into bars. The number of notes in a bar depends on the length of the note and the time signature. Common time is 4/4, or four beats in a bar, a waltz is in 3/4. Many short notes can fit into one bar and a long note may stretch over several bars.

It's not the purpose of this article to go into the theory of music notation. If you don't understand it, sit down with an instrument and any beginner's music tutorial, and you'll grasp the basics within half an hour. It is not difficult. The hard part is learning to play the instrument. Most music software displays music graphically, in the traditional method, using the standardised notation.

Some software will tidy your music up. If you put too many notes in a bar the extra notes will be moved into the next bar. There are various ways of displaying and manipulating the music. Some programs allow you to plug in an instrument and play a note, which is then displayed on the screen, on a five line staff. This is relatively easy to do. The task becomes more difficult if the notes are to be recorded in real time. Besides having a pitch, a note has a length and different length notes have different symbols and different names.

If a computer is to record the duration of sound it must have a way of timing each note. If you hit one key on a piano keyboard, or one string on a guitar, you play a note. If you hit several notes simultaneously, you play a chord. Some synthesisers only allow you to play one note at a time. These are called monophonic synthesisers. More sophisticated machines can cope with more channels. These are polyphonic synthesisers and can play chords and multiple

melodies. Connecting a micro to a monophonic synthesiser will not turn it into a polyphonic synthesiser.

The way a note is played also affects its quality. Sometimes a pianist bangs his finger down hard, sometimes gently, creating two sounds from the same key. Some synthesisers have this facility.

It is now possible to compose music directly on the screen without mastering the skills of playing an instrument. This is one of the great advantages of electronic sound. It is no longer



Thanks to Pythagoras, Jimmy Hendrix and the Atari 520 ST

necessary to play an instrument to make music. You can put notes on to staves with a mouse, cursor keys or even a light pen, define the timing, and get the computer to play the music.

As well as the pitch and duration of a note, the computer can also define the tone. A quaver at middle C looks the same on a sheet of music whether it is played by a violin or harmonica. The tone is determined by the factors we discussed earlier, envelope shape, wave shape and so on.

A good program allows easy definition and editing of these features. Newly defined voices and instruments are then assigned melodies. The resulting composition can be edited on screen. The computer sends the music to a digital to analogue converter which converts it to an analogue voltage. This is the type given out by a record or tape deck and can be played through an amplifier and speakers in the same way as an audio cassette.

Pythagoras, Jimmy Hendrix and the 520ST have made it possible to fill your home with your own electronic music. In a later article we will look at the software that is on the way to help you do this with your ST. My thanks to Andy Bridle for help with this article.





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Making the most of your ST

WHEN any machine is launched, it's inevitable that new users will have lots of questions they want answering.

That's what this section of Atari ST User is for. So whatever your queries on Atari ST hardware and software, this is the place to get them answered.

Until your questions start flowing in, I'll spend some of this and next month's column discussing a couple of commands in Basic that allow you to access the very heart of the Gem operating system.

On pages C-57 and C-156 of the ST's Basic manual you may have noticed two strange looking commands called GEMSYS and VDISYS. These are explained rather scantily in only one page each, but they require far more discussion. Using them you can gain access to some of Gem's inner routines that are not normally available from Basic.

The GEMSYS command gives access to the half of Gem called the application environment services, or AES, and the VDISYS allows you to use the other half of Gem called the virtual device interface, or VDI. The AES deals with windows, alert boxes, menu bars and the mouse. AES routines are used in the control of objects on the screen. The VDI contains all the routines to do such things as draw lines, fill areas and write text. It takes care of everything that is placed on the screen.

This month I'll be looking at the VDI routines and the VDISYS command. Next month I'll be discussing the GEMSYS command and AES.

The VDISYS command is followed by one number in brackets. This is known as a dummy parameter, because its value has no effect.

Send your ST queries to:
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VALUE	1	2	4
NAME	BOLD	GREY	ITALIC

Figure II

Values are passed to the VDI via three variables – CTRL, PTSIN and INTIN.

To pass values to the VDI, you simply poke those values into the correct variables – for example POKE CTRL, 6 – and then call the VDI with VDISYS(1). Searching through the VDI manual, which is only supplied to software houses, I have found four VDI routines that do not have an equivalent Basic command and therefore can be used to great effect in your programs.

The value that must be poked into the variables are given in Figure I. I have included a demonstration program for each routine so that you can type them in and see for yourself. Here is a quick explanation of what each one does.

BAR draws a filled box and can be used to clear or fill rectangular areas of the screen very quickly. You must poke the coordinates of the box's upper left and lower right hand corner into PTSIN. See the demo program to see how it's done.

CHARACTER HEIGHT lets you place text on the screen in a variety of different sizes. The required height is poked into PTSIN+2. The normal height is 13. See the demo program for more information.

CHARACTER SLANT gives you the ability to print characters sideways and upside down. The angle, in the range 0-3600 (tenths of a degree) must be poked into INTIN. However, only 0, 900, 1800 and 3600 will produce any result. See the demo program.

TEXT TYPE allows you to print text in different ways. The ways available are bold, italic, underlined, shadow, outlined and grey. You simply poke the required type into INTIN, according to Figure II. If you wish to mix any of the types, simply add their values together, for example to get underlined bold the value is 9, and poke the value into INTIN. To return to normal, you must poke INTIN with zero. See the program for more details.

The first problem to come in this month is from K. O'Connor, from Leominster. He wants to keep an address file on disc and wishes to know

	CTRL				PTSIN				INTIN
	+0	+2	+6	+10	+0	+2	+4	+6	+8
BAR	11	2	0	1	X	Y	X	Y	
					upper	upper	lower	lower	
CHAR HT.	12	1	0		0	HT.			
CHAR SLANT	13	0	1						ANGLE (0-3600)
TEXT TYPE	106	0	1						TYPE (See chart)

VDI ROUTINES

8	16	32
UNDER- LINED	OUTLINED	SHADOW

how to read and write files to disc. This can be accomplished in a Basic program using the Open, Input#, Print# and Close commands that are discussed in full in the Basic manual.

Writing such a program is not a difficult task, but could take quite a long time. A better solution would be to set up an address database using the free program - DBMaster One. Using this program you could set up an address file and search through it, sort it and manipulate it in a hundred and one ways that would be difficult to do in Basic.

A tip in time...

● If you find that memory is running short you can save a few k by erasing some accessories from your system disc. First make a backup of the system disc! The accessories are held in two files on the system disc, called Desk1.acc and Desk2.acc. Desk1.acc contains the control panel and printer install accessories and Desk2.acc holds the RS232 configuration and VT-52 terminal.

Decide which pair you can do without and then erase the relevant file. For example, if you never use the RS232 interface and don't use the VT-52 terminal you should delete Desk2.acc. Doing this will save you some 6260 bytes (deleting Desk1.acc will give you 15400 bytes) which you can use for applications and RAM discs.

● If you haven't already obtained the latest set of bundled software, then you should pester your dealer until he gives you copies. The latest set comes on three white labelled discs and is made up of Megaroids (fairly good asteroids game), First Word (word processor), DBMaster One (database program) and Doodle (fairly simple drawing program).

● If you have a program that you always run as soon as you have booted your ST such as a RAM disc, you can make it run automatically using the following method. First back-up your system disc. Next create a folder called AUTO on the

```
100 REM-----BAR DEMO-----
110 REM
120 FULLW 2 : CLEARW 2 : COLOR 1,1,1,1,1
130 POKE CTRLN,11
140 POKE CTRLN,12,2
150 POKE CTRLN,16,0
160 POKE CTRLN,10,1
170 POKE PTIN,50 : REM TOP LEFT X = 50
180 POKE PTIN+2,50 : REM TOP LEFT Y = 50
190 POKE RTIN+4,100 : REM BOTTOM RIGHT X = 100
200 POKE PTIN+6,100 : REM BOTTOM LEFT Y = 100
210 VDISYS(1)
```

```
100 REM-----CHARACTER HEIGHT-----
110 REM
120 FULLW 2 : CLEARW 2 : COLOR 1,1,1,1,1
130 POKE CTRLN,12
140 POKE CTRLN,12,1
150 POKE CTRLN,16,0
160 POKE PTIN,0
170 FOR I = 1 TO 15
180 POKE PTIN+2, I
190 VDISYS(1)
200 PRINT "ATARI USER",
210 NEXT I
220 POKE PTIN+2, 15 : REM PUT BACK TO NORMAL
230 VDISYS(1)
```

```
100 REM-----TEXT TYPE-----
110 REM
120 FULLW 2 : CLEARW 2 : COLOR 1,1,1,1,1
130 POKE CTRLN,16
140 POKE CTRLN,12,0
150 POKE CTRLN,16,1
160 FOR I = 0 TO 5
170 POKE INTIN, 12+I : VDISYS(1)
180 PRINT "ATARI USER ",I
190 POKE INTIN, 0 : VDISYS(1) : REM RETURN TO NORMAL
200 NEXT I
210 PRINT
220 INPUT A$ : REM WAIT FOR CARRIAGE RETURN
```

```
100 REM-----CHARACTER SLANT-----
110 REM
120 FULLW 2 : CLEARW 2 : COLOR 1,1,1,1,1
130 POKE CTRLN,12
140 POKE CTRLN,12, 0
150 POKE CTRLN,16, 1
160 FOR I = 0 TO 3600 STEP 500
170 POKE INTIN, I : VDISYS(1)
180 GOTOXY 15, (I/900)
190 PRINT "0"
200 NEXT I
210 POKE INTIN, 0 : REM RETURN TO NORMAL
220 VDISYS(1)
```

Four demonstration programs that show different features of the ST

system disc. In it you must place the program that you want to auto run. Now when you boot the system with that system disc and booting has finished the usual blank screen will be replaced with the program rather than the desktop.

Well, that's it for another month. As one last piece of advice, I'll recommend that you go to the Atari User Show if at all possible. All the software that you've heard about during the last few months will be on show and you'll be able to have a good look at new hardware such as the ST hard disc from Atari. I should be at the show on the Friday. Maybe I'll see you there.



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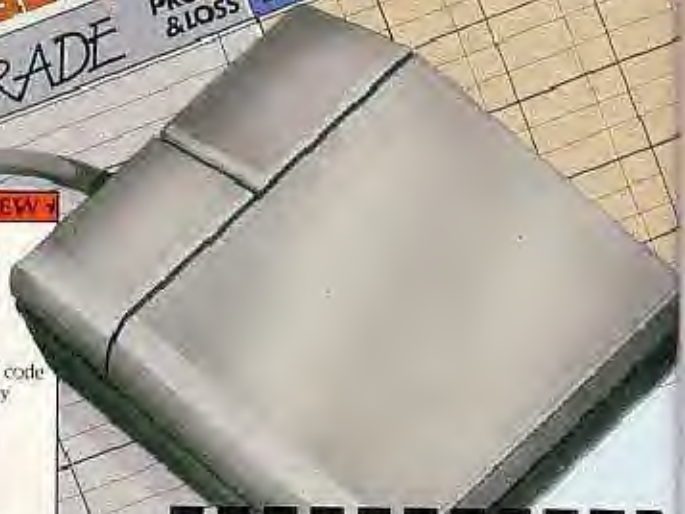
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